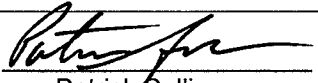


## EENS Job Risk Assessment

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|  |  |   |                   |            |                    |                               |
|--|--|---|-------------------|------------|--------------------|-------------------------------|
| <b>Name(s) of Risk Team Members:</b><br>L. Bowerman, D. Elling, J. Johnson, R. Lofaro, A. Piper  | <b>Point Value</b> →<br><b>Parameter</b> ↓ | <b>1</b>                                    | <b>2</b>          | <b>3</b>   | <b>4</b>           | <b>5</b>                      |
| <b>Job Title:</b> Thermal Use of Ovens, Furnaces, etc.   | <b>Frequency<br/>(B)</b>                   |   |                   |            |                    |                               |
| <b>Job Number or Job Identifier:</b> EENS-JRA-024  |  | ≤once/year                                  | ≤once/month       | ≤once/week | ≤once/shift        | >once/shift                   |
| <b>Rev. #: 0</b> <b>JRA Date: 5/9/06</b>   |  |   |                   |            |                    |                               |
| <b>Job Description:</b> Work with ovens, furnaces, dryers, hot plates, heat treating (annealing), convection ovens, and other equipment/processes with thermal hazards | <b>Severity<br/>(C)</b>                    | First Aid Only                              | Medical Treatment | Lost Time  | Partial Disability | Death or Permanent Disability |
| Training and Procedure List (Optional):  | <b>Likelihood<br/>(D)</b>                  | Extremely Unlikely                          | Unlikely          | Possible   | Probable           | Multiple                      |
| <b>Approved by:</b>  <b>Date:</b> 8/31/06<br>Patrick Sullivan                         |  |   |                   |            |                    |                               |
| <b>Stressors (if applicable, please list all):</b> none  |  | <b>Reason for Revision (if applicable):</b> |                   |            | <b>Comments:</b>   |                               |

|  |                                     |   |               | Before Additional Controls |             |            |              |               |                                 | After Additional Controls |               |             |            |              |               |                  |
|--|-------------------------------------|---|---------------|----------------------------|-------------|------------|--------------|---------------|---------------------------------|---------------------------|---------------|-------------|------------|--------------|---------------|------------------|
| Job Step / Task  | Hazard                              | Control(s)                                    | Stressors Y/N | # of People A              | Frequency B | Severity C | Likelihood D | Risk* AxBxCxD | Control(s) Added to Reduce Risk | Stressors Y/N             | # of People A | Frequency B | Severity C | Likelihood D | Risk* AxBxCxD | % Risk Reduction |
| Routine chemical use                                   |                                     | See EENS-JRA-009                              |               |                            |             |            |              |               |                                 |                           |               |             |            |              |               |                  |
| Use of compressed gases cylinders                      |                                     | See EENS-JRA-001                              |               |                            |             |            |              |               |                                 |                           |               |             |            |              |               |                  |
| Use of pressurized systems                             |                                     | See EENS-JRA-020                              |               |                            |             |            |              |               |                                 |                           |               |             |            |              |               |                  |
| Use of hot converters to measure species in atmosphere | Burns from contact with hot surface | ESR, work planning, labeling, appropriate PPE | N             | 1                          | 2           | 1          | 3            | 6             |                                 |                           |               |             |            |              |               |                  |

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|--|---|---|---------------|----------------------------|-------------|------------|--------------|---------------|---------------------------------|---------------------------|---------------|-------------|------------|--------------|---------------|------------------|
| Job Step / Task  | Hazard                                  | Control(s)  | Stressors Y/N | # of People A              | Frequency B | Severity C | Likelihood D | Risk* AxBxCxD | Control(s) Added to Reduce Risk | Stressors Y/N             | # of People A | Frequency B | Severity C | Likelihood D | Risk* AxBxCxD | % Risk Reduction |
| Operating ovens, furnaces, convection ovens, and other thermal equipment | Burns from contact                      | Equipment design, insulation, appropriate tools (e.g., tongs, etc.), appropriate PPE (e.g., aprons, safety glasses, and gloves), postings, ESR, work planning, housekeeping, Tier 1 inspections, High limit control | N             | 1                          | 5           | 2          | 3            | 30            |                                 |                           |               |             |            |              |               |                  |
|  | Electrical shock from faulty equipment  | Disconnect power when servicing, inspection of equipment, equipment design, appropriate PPE, ESR, work planning, housekeeping, Tier 1 inspections   | N             | 1                          | 5           | 4          | 1            | 20            |                                 |                           |               |             |            |              |               |                  |
|  | Reflex “jerk” injury from burn or shock | Equipment design, insulation, appropriate tools (e.g., tongs, etc.), appropriate PPE (e.g.: aprons, safety glasses, and gloves), postings, ESR, work planning, housekeeping, Tier 1 inspections, High limit control | N             | 1                          | 5           | 2          | 3            | 30            |                                 |                           |               |             |            |              |               |                  |
| Use of bench top hot plates and stirrers                                 | Burns from contact                      | Equipment design, insulation, appropriate tools (e.g., tongs, etc.), appropriate PPE (e.g.: aprons, safety glasses, and gloves), postings, ESR, work planning, housekeeping, Tier 1 inspections                     | N             | 1                          | 3           | 1          | 3            | 9             |                                 |                           |               |             |            |              |               |                  |
|  | Electrical shock from faulty equipment  | Disconnect power when servicing, inspection of equipment, equipment design, appropriate PPE, ESR, work planning, housekeeping, Tier 1 inspections   | N             | 1                          | 3           | 3          | 1            | 9             |                                 |                           |               |             |            |              |               |                  |

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|---|---|---|---------------|----------------------------|-------------|------------|--------------|---------------|---------------------------------|---------------------------|---------------|-------------|------------|--------------|---------------|------------------|
| Job Step / Task   | Hazard  | Control(s)  | Stressors Y/N | # of People A              | Frequency B | Severity C | Likelihood D | Risk* AxBxCxD | Control(s) Added to Reduce Risk | Stressors Y/N             | # of People A | Frequency B | Severity C | Likelihood D | Risk* AxBxCxD | % Risk Reduction |
|   | Reflex “jerk” injury from burn or shock                 | Equipment design, insulation, appropriate tools (e.g., tongs, etc.), appropriate PPE (e.g.: aprons, safety glasses, and gloves), postings, ESR, work planning, housekeeping, Tier 1 inspections | N             | 1                          | 3           | 1          | 3            | 9             |                                 |                           |               |             |            |              |               |                  |
|   | Fracture of glassware resulting in lacerations or burns | Visual inspection of glassware, appropriate PPE (e.g., safety glasses, gloves), ESR, work planning, housekeeping, appropriate tools (e.g., tongs, etc.), Tier 1 inspections                     | N             | 1                          | 3           | 1          | 3            | 9             |                                 |                           |               |             |            |              |               |                  |
| Use of laboratory fabricated heating elements (heat tapes, immersion heaters, etc.) | Burns from contact                                      | Equipment design, insulation, appropriate tools (e.g., tongs, etc.), appropriate PPE (e.g., aprons, safety glasses, and gloves), postings, ESR, work planning, housekeeping, Tier 1 inspections | N             | 1                          | 2           | 1          | 2            | 4             |                                 |                           |               |             |            |              |               |                  |
|   | Electrical shock from faulty equipment                  | Disconnect power when servicing, inspection of equipment, equipment design, appropriate PPE, ESR, work planning, housekeeping, Tier 1 inspections   | N             | 1                          | 2           | 3          | 3            | 18            |                                 |                           |               |             |            |              |               |                  |
|   | Reflex “jerk” injury from burn or shock                 | Equipment design, insulation, appropriate tools (e.g., tongs, etc.), appropriate PPE (e.g., aprons, safety glasses, and gloves), postings, ESR, work planning, housekeeping, Tier 1 inspections | N             | 1                          | 2           | 1          | 3            | 6             |                                 |                           |               |             |            |              |               |                  |
| Use of arc furnace  | Eye injury from intense light – arc flash               | Equipment design, ESR, work planning, appropriate PPE   | N             | 1                          | 2           | 3          | 2            | 12            |                                 |                           |               |             |            |              |               |                  |

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|--|--|--|----------------------|----------------------------|-------------|------------|-------------------------|---------------|---------------------------------|---------------|------------------------------|-------------|------------|--------------|---------------|------------------|
| Job Step / Task  | Hazard   | Control(s)   | Stressors Y/N        | # of People A              | Frequency B | Severity C | Likelihood D            | Risk* AxBxCxD | Control(s) Added to Reduce Risk | Stressors Y/N | # of People A                | Frequency B | Severity C | Likelihood D | Risk* AxBxCxD | % Risk Reduction |
| Attaching or modifying wiring, thermocouples, sensors or control circuits to furnaces or other equipment | Burns from contact                             | Equipment cooled prior to work, gloves, insulation, PPE, postings, work planning, housekeeping   | N                    | 1                          | 1           | 3          | 2                       | 6             |                                 |               |                              |             |            |              |               |                  |
|  | Electrical shock                               | Disconnecting power prior to servicing; training, insulation, PPE, basic electrical safety training  | N                    | 1                          | 1           | 3          | 2                       | 6             |                                 |               |                              |             |            |              |               |                  |
|  | Reflex "jerk" injury from burn or shock        | Equipment cooled prior to work, gloves, insulation, PPE, postings, work planning, housekeeping, disconnecting power prior to servicing   | N                    | 1                          | 1           | 1          | 2                       | 2             |                                 |               |                              |             |            |              |               |                  |
| Removing samples or equipment that has been heated   | Injury from breaking of the temperature change | Insulation, allowing item to cool prior to handling, appropriate tools (e.g., tongs, etc.), appropriate PPE (e.g., aprons, safety glasses, gloves, etc.), instrument design, programmable controls, work planning, ESR | N                    | 1                          | 2           | 1          | 2                       | 4             |                                 |               |                              |             |            |              |               |                  |
| Further Description of Controls Added to Reduce Risk:  |  |  |                      |                            |             |            |                         |               |                                 |               |                              |             |            |              |               |                  |
| *Risk:   | 0 to 20<br>Negligible                          | 21 to 40<br>Acceptable   | 41 to 60<br>Moderate |                            |             |            | 61 to 80<br>Substantial |               |                                 |               | 81 or greater<br>Intolerable |             |            |              |               |                  |